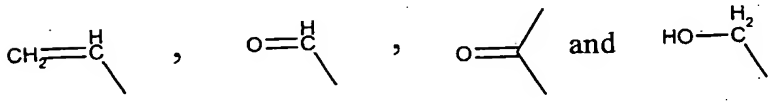
What is claimed is:

1. A method for immobilising a desired molecule on a silicon substrate, the method comprising the steps:

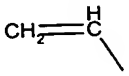
   (A) providing an Si-H surface on the silicon substrate; and

   (B) attaching the desired molecule to the Si-H surface via a covalent bond.

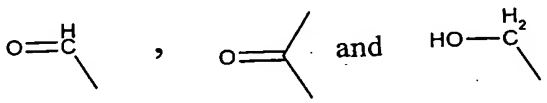
2. The method of claim 1, wherein the covalent bond to the surface is formed by reaction of the Si-H surface with a functionality selected from the group consisting of:



3. The method of claim 1, wherein the covalent bond to the surface is formed by reaction of the Si-H surface with:



4. The method of claim 1, wherein the covalent bond to the surface is formed by reaction of the Si-H surface with a functionality selected from the group consisting of:



5. The method of claim 1, wherein the covalent bond to the surface is formed in a thermal reaction.

6. The method of claim 1, wherein the covalent bond to the surface is formed in a photochemical reaction.

7. The method of claim 1, wherein the silicon substrate is porous silicon.

8. The method of claim 1, wherein the desired molecule is a biomolecule.

9. The method of claim 1, wherein the desired molecule is selected from the group consisting of an RNA, a DNA, a protein, a carbohydrate and conjugates of these molecules.

10. A method for providing a coupling group on a silicon substrate, the method comprising the steps:

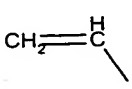
(A) providing an Si-H surface on the silicon substrate;

(B) reacting the Si-H surface with a linker-molecule possessing at least one anchor functionality capable of reacting with the Si-H surface to form an Si-C or Si-O linkage, and further possessing at least one coupling group and/or protected coupling group which does not react with the Si-H surface; and

(C) removing unreacted linker-molecule.

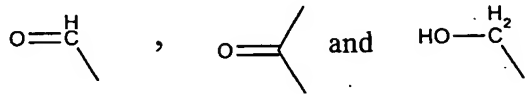
11. The method of claim 10, wherein the functionality capable of reacting with the Si-H surface is selected from the group consisting of

12. The method of claim 10, wherein the functionality capable of reacting with the Si-H surface is



c 13 25 37 – 52

13. The method of claim 10, wherein the functionality capable of reacting with the Si-H surface is selected from the group consisting of:



14. The method of claim 10, wherein step (B) is carried out thermally.

15. The method of claim 10, wherein step (B) is carried out photochemically.

16. The method of claim 10, wherein the coupling group is selected from the group consisting of

a group capable of reacting with a thiol to form a thioester linkage;

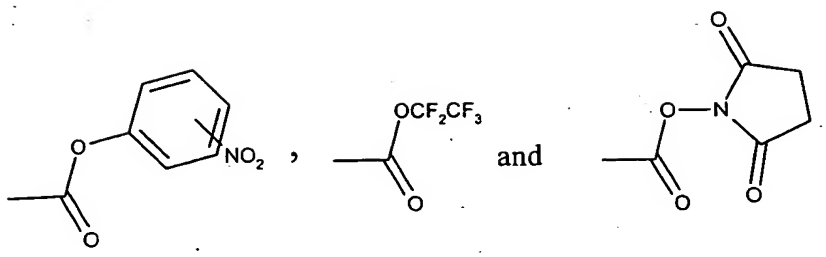
a group capable of reacting with an amine to form an amide linkage; and

a group capable of reacting with an alcohol, to form an ester linkage.

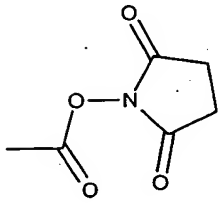
17. The method of claim 10, wherein the coupling group is a carboxyl group.

18. The method of claim 10, wherein the coupling group is a an activated carboxyl group.

19. The method of claim 10, wherein the coupling group is selected from the group consisting of:



20. The method of claim 10, wherein the coupling group is:



21. The method of claim 10, wherein the silicon substrate is porous silicon.

22. A method for immobilising a desired molecule on a silicon substrate, the method comprising the steps:

(A) providing an Si-H surface on the silicon substrate;

(B) optionally reacting the Si-H surface with a linker-molecule possessing at least one anchor functionality capable of reacting with the Si-H surface to form an Si-C or Si-O linkage, and further possessing at least one coupling group and/or protected coupling group which does not react with the Si-H surface;

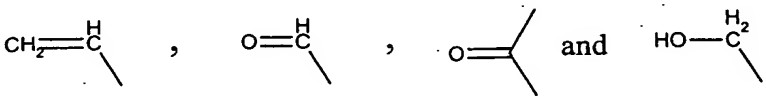
(C) removing unreacted linker-molecule, if used;

(D) if a protected coupling group is present, deprotecting the protected coupling group; and

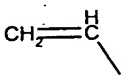
(E) reacting the coupling group with the desired molecule; or

(F) reacting the Si-H surface with the desired molecule which possesses at least one anchor functionality capable of reacting with the Si-H surface to form an Si-C or Si-O linkage.

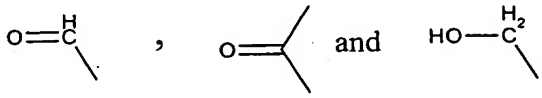
23. The method of claim 22, wherein the functionality capable of reacting with the Si-H surface is selected from the group consisting of



24. The method of claim 22, wherein the functionality capable of reacting with the Si-H surface is



25. The method of claim 22, wherein the functionality capable of reacting with the Si-H surface is selected from the group consisting of:



26. The method of claim 22, wherein step (B) or step (F) is carried out thermally.

27. The method of claim 22, wherein step (B) or step (F) is carried out photochemically.

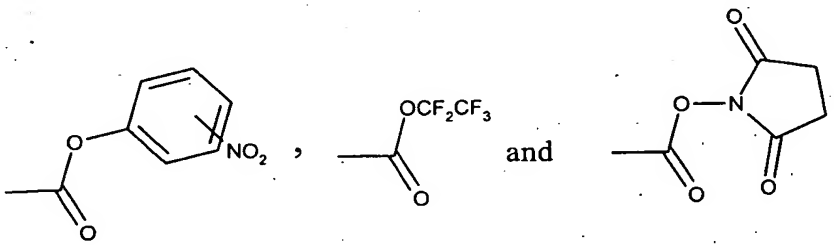
28. The method of claim 22, wherein the coupling group is selected from the group consisting of

a group capable of reacting with a thiol to form a thioester linkage;
a group capable of reacting with an amine to form an amide linkage; and
a group capable of reacting with an alcohol, to form an ester linkage.

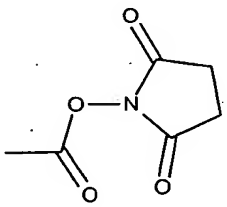
29. The method of claim 22, wherein the coupling group is a carboxyl group.

30. The method of claim 22, wherein the coupling group is a an activated carboxyl group.

31. The method of claim 22, wherein the coupling group is selected from the group consisting of:



32. The method of claim 22, wherein the coupling group is:



33. The method of claim 22, wherein the desired molecule is selected from an RNA, a DNA, a protein, a carbohydrate, and conjugates of these molecules.

34. The method of claim 22, wherein the desired molecule is a DNA.

35. The method of claim 22, wherein the desired molecule is an antibody.

36. The method of claim 22, wherein the silicon substrate is porous silicon.

37. A modified silicon substrate bearing on its surface a desired molecule attached via an Si-C or Si-O bond.

38. The modified silicon substrate of claim 37, which is porous silicon.

39. The modified silicon substrate of claim 37, which is Si(100) or Si(111).

40. The modified silicon substrate of claim 37, wherein the desired molecule is attached via an Si-C bond.

41. The modified silicon substrate of claim 37, wherein the desired molecule is selected from the group consisting of an RNA, a DNA, a protein, a carbohydrate, and conjugates of these molecules.

42. The modified substrate of claim 37, wherein the desired molecule is a DNA.

43. The modified substrate of claim 37, wherein the desired molecule is an antibody.

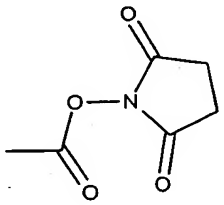
44. A silicon substrate bearing a linker molecule attached through an Si-C or Si-O linkage, wherein the linker molecule bears a coupling group, the coupling group being capable of reacting with a bio-molecule, to covalently link the bio-molecule to the silicon substrate.

45. The substrate of claim 44, wherein the silicon is porous silicon.

46. The substrate of claim 44, wherein the silicon is Si(111) or Si(100)

47. The substrate of claim 44, wherein the linker molecule is attached to the silicon substrate by an Si-C linkage.

48. The substrate of claim 44, wherein the coupling group is:



49. A modified silicon substrate bearing a bio-molecule attached to the substrate through an Si-C or Si-O linkage.

50. The modified substrate of claim 49, wherein the bio-molecule is attached to the substrate via an Si-C linkage.

51. The modified substrate of claim 49, wherein the silicon is porous silicon.

52. The modified substrate of claim 49, wherein the silicon is Si(111) or Si(110).